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AUTHOR	Heslinga, John
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ABSTRACT

Alberta's Career and Technology Studies (CTS) curriculum is a new way to organize the previous practical arts curricula to allow flexibility and accessibility. The basis of CTS is its modular framework. The curriculum is organized around a framework of more than 21 career or technology strands. The strands are common areas of study, relating to industry sectors, that help organize the modules of the curriculum into career-related groups. Many skills, areas of knowledge, and attitudes in the career spectrum are transferrable from career to career. Each career strand contains many curriculum modules consisting of skills, information, attitudes, and material that can be taught in approximately 17-25 hours. The modules range from entry-level through advanced and career-specific skills. By selecting a series of modules, a course can be built to meet the needs of individual students, with a focus on competencies rather than time spent. Although the curriculum is flexible, it is also prescriptive and accountable. The documentation describes specifically the requirements of any module. The curriculum also includes resource suggestions and facility requirements. (A series of transparencies illustrating this curriculum are included in the document.) (KC)

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Alberta's Flexible Career and Technology Studies Curriculum Meets Most of Our Students' Needs

John Heslinga
Edmonton Public Schools

Presented to the International Technology Education Association Annual Conference

Fort Worth, Texas
March 8, 1998

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Career and Technology Studies (CTS)
Alberta's New Flexible Curriculum

ITEA, Fort Worth Presentation
John Heslinga
Assistant Principal, Technology Co-ordinator
Rosslyn School
Edmonton Public Schools
jhesling@epsb.edmonton.ab.ca

Alberta's New Career and Technology Studies (CTS), is a new and exciting way to organize our previous practical arts curriculums in such a way that it allows flexibility and accessibility. This new curriculum, with mandatory implementation beginning in September 1997, encompasses the curricular areas of the practical arts, business education, vocational education, technical education, and technology education.(Because of it's unique format, it has the ability to keep the curriculum contemporary and up to date without the long delays that many curriculums require.(10 years or more) It allows almost every student in Alberta to access the career and technology education they require, and school districts the flexibility to offer valid programming that would take years to approve. Today, I will be discussing the CTS curriculum and how it is used in Alberta. I will also show how its vast array of curriculum modules can be used to create courses and programming that can meet the needs of almost every student and/or community well into the future using its ability to adapt to unforeseen changes in technologies or careers that are not in existence today. A quick overview on how it can be used to create technology courses at the Junior high school level will also be provided.

You will begin to see how in situations where it is impossible to offer programming though traditional educational establishments, schools, districts, communities, students, and teachers can work within the framework of CTS to look almost anywhere to accommodate their needs.

In order for all of us to be on the same chapter during my discussion , it is imperative to discuss a few definitions, because some terms are used differently between Alberta and the International Technology Education Association, (ITEA) and because of their different uses across our boarders.

The term **Technology**, is used very differently (not only between Alberta and ITEA, I might add, but between many educators as well) (I'm sure you've heard a principal or some other school official state to his/her audience that they now teach "Technology" in their school when they are talking about the new computers they just purchased or the CNC Milling Machine they are showing).

In Alberta the term technology is used in that same sense, most discussions surrounding the curriculum still include teaching technology as the teaching of a particular "High Tech" area of study (For example teaching Computers) I will use the term **"The Technologies"** whenever I intend to use this definition

Technology, as a term used by ITEA on the other hand, means, the humans interaction with the world through the ability to create processes that will change the way they interact with it, and the process of creating technology. Or as Wright(1992) describes as a body of knowledge and action that is used by humans to extend their potential for controlling and modifying the natural and human made environment. This is my personal preference for technology

An other term that is used very differently across our borders is Module. In relation to CTS, a **Module** is a unit of curriculum. It defines the knowledge, skills and attitudes as entry / exit level competencies. These are the basic building blocks of curriculum material used to create courses.

The basis of CTS is on its Modular Framework, and modules should not be confused with the learning activity modules that are being distributed by many commercial manufacturers. For those commercial members in the audience, you might see this as an opportunity opening for you as well.

If our descriptions for technology and modules are so different, then we need to also be on the same page when we describe Technology Education. I will use the ITEA definition which identifies, **Technology Education** as the study of Technology as a distinct curriculum area. The problem solving, technology literacy, and design course of studies that is being encouraged by ITEA, and described By Savage and Sterry in their landmark document "A Conceptual Framework for Technology Education"

ITEA(1985) describes Technology education as; "a comprehensive, action-based educational program concerned with technical means, their evolution, utilization, and significance; with industry, its organization, personnel, systems,

techniques, resources, and products; and their social/cultural impact" (p.25)

Although there are differences in terminology, Technology Education (ITEA definition) and CTS are indeed compatible and as I proceed, you will begin to see how they are. It will also become evident how CTS opens the doorway to Technology Education being taught in Alberta's schools.

Career and Technology Studies is organized around a framework of over 21 career or technology strands. (This number can and does change as part of the dynamic way this curriculum keeps current). These are common areas of study, relating to industry sectors and intended only to help organize the modules of curriculum into career related groups. A currant of these strands are;

Agriculture
Career Transitions
Communication Technology
Community Health
Construction Technologies
Cosmetology
Design Studies
Electro Technologies
Energy and Mines
Wildlife
Enterprise and Innovation
Fabrication Studies
Financial Management
Foods
Forestry
Information Processing
Legal Studies
Management and marketing
Mechanics
Tourism Studies

This model in the next slide will illustrate the interrelation of skills in career strands, (**Career circle O-Head**) Many skills, knowledges, and attitudes in the career spectrum are similar from career to career. Others are universal in nature. Therefore it is understood that some modules may be selected from any career or technology strand to enhance the course an educator might be planning. An example of such transferable skills is pattern drafting. We use pattern drafting in the manufacture of sheet metal products and we must also use similar skills in the manufacture of clothing, furniture upholstery, and model making in product design. Therefore an educator teaching a clothing manufacturing course would select the same design module as the sheet metal instructor. The Technology Teacher on the other hand would use parts of the design module as curriculum material for the Technology Studies course. It is clear that the focus will be different for specific strands, but the underlying skills are not.

Each career strand contains a multitude of curriculum modules consisting of skills, information, attitudes, and material that can be taught in approximately 17 to 25 hours. The Modules range from entry level skills, or introductory level material, through to advanced material, and career specific skills.

As seen in this next chart we have a list of modules in the Design Studies Strand

Sketching, Drawing and Modelling-Fundamentals **(intro level)**
The Design Process **(intro level)**
Design Techniques-Fundamentals **(intro level)**
Design Problems-Fundamentals **(intro level)**
CADD-Fundamentals **(intro level)**
Drafting for Design-Fundamentals **(intro level)**
2-D design-Applications **(Intermediate level)**
3-D design-Applications **(Intermediate level)**
CADD-Applications **(Intermediate level)**
Drafting for design - Applications **(Intermediate level)**
Technical Drawing - Applications **(Intermediate level)**
The evolution of design **(Intermediate level)**
2-D design - Studio (Form Composition and Aesthetics) **(Advanced Level)**
2-D design - Studio (Communication and Human Factors) **(Advanced Level)**
2-D design - Studio (Materials and Production Processes) **(Advanced Level)**
3-D design - Studio (Form Composition and Aesthetics) **(Advanced Level)**
3-D design - Studio (Communication and Human Factors) **(Advanced Level)**
3-D design - Studio (Form Composition and Aesthetics) **(Advanced Level)**
Living Environments - Studio (Human & environmental needs) **(Advanced Level)**
Living Environments - Studio (Form and space) **(Advanced Level)**
Living Environments - Studio (Materials and products processes) **(Advanced Level)**

A very quick perusal of the preceding list of modules would indicate a course created by using only modules from this strand would be very career oriented indeed. And this is part of the "Career" aspect that the curriculum addresses. It is also very evident that the Advanced level modules are very career specific and unlikely to be used in other strands. But one has to remember that if all of these modules were taught it would take approximately 525 hours. Obviously this would be a program of studies and not just one course. Depending on the resources of the school maybe even impossible to get access to all of the modules.

Within each strand, modules are organized into three levels of achievement; Introductory, Intermediate and Advanced. A program intending a student to follow a particular strand for career entry level training, would naturally follow the sequence outlined in each strand. Different courses would have modules starting at the introductory level and moving to more advanced levels where more specific skills are included.

A teacher setting up a course for introductory design for example, would choose anywhere from 3 to 5 modules of curriculum for that course in the Introductory and intermediate levels. The teacher would decide on the focus of the course and because valid curriculum modules have been chosen , the course would be a valid course under the auspices of the mandated curriculum.

Students who have satisfied the outgoing competencies of a module would be considered to have completed that module and would earn 1 credit toward a high school diploma. Should they need that module of information in any other course or program, elsewhere, they will be considered to have completed it and not expected to redo that module.

Students not completing a course could in fact have completed a number of modules within the course and would be credited for those modules and therefore, partially completing the course. (Should they need to repeat the course they would begin where they left off)

By selecting a series of modules, a course can be built to meet the needs of the student. Dropping and or adding modules to a course should they be required to meet the changing need. A wise teacher would create a course that might cover 5 modules for instance, and it is the expectation that students to complete 4. This would help to meet the needs of those students who come into a class with a wide range of previous skills. The student who completes all 5 would be credited accordingly. Maybe a student who misses prerequisite courses could be tutored to catch up and then receive credit for the prerequisite modules as well.

It should be quite evident that the tie to time has finally disappeared (The Carnegie unit is being set to rest) and that the focus is now on competencies. As a competency based curriculum, we see it becoming the model for future curriculum organizations in Alberta in all subject areas.

This was not a difficult curriculum transition for senior high school teachers of Career or Technology related disciplines because they simply choose material in their specific strand to create a course. Teachers in junior high schools, who were teaching Industrial Arts (The Alberta Plan) and Home Economics, were required to reassess their programs because these curriculum areas were no longer necessarily separate areas of study, but components of each can be found in many of the introductory modules of the new CTS curriculum.

Because students do not receive high school credit for courses taken at the junior, or middle school level, the curriculum allows a CTS course at the Junior high school to cover only small parts of modules if desired to create innovative programming. (students are required to have access to 3 elective courses per year) And (Exploratory and introductory programming is encouraged at the junior high school.) Hence the open door for Technology Education, and other innovative interpretations of the curriculum. Teachers will begin to see the advantages of integrating technology competencies into regular core curriculum. (I will be discussing examples of this a little later with some discussion on Technology Education)

In fact a document is available to Alberta teachers, called Technology Studies, A Technology Education Program that meets the requirements of CTS, including learning activities and module cross references. This document is intended to be a teachers package that allows them to provide an ITEA endorsed technology education course at the junior high school level. It uses learning activities identified as appropriate for teaching Technology by the Michigan, Ohio, Technology Education Consortium, and assembled by that group.

The following example of a module from the Foods Strand will give us an idea how the focus we put a module can give it a very different flavour.
Module #FOD214 "Rush hour Cuisine"
Prerequisite / Co-requesite Food basics #FOD101

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description- Too little time to cook?? Learn unique ways to create delicious dishes quickly and easily from simple ingredients of prepared and convenience foods.

If we were using this module in a foods class, it would be very clear what might be expected for this module. The very kind of cooking I have to go through a lot of days on my return to home from a busy day at school. (Pretty familiar right??) Slight modifications in focus would allow this module be used in a tourism course focusing on "Inn management". (Example course: "Inn Management" one of the courses offered by a New England High school where a lot of students could easily work for small family run Inns) This changes the focus to Fast, Convenient meal preparation for customers. Different convenience foods would be discussed. And different levels of preparation. Note that we can now begin to address the needs of student in their community. (This type of course may only be needed for 2 to three years and needed immediately. Curriculum development could take much too long to get a course like this approved by the department of education. (Developed and approved))

The Specifications of this module are outlined in a document that looks like this: **(Module spec sheets Overhead)**
I would like to highlight the following things on these sheets.
Description of Module- This gives the purpose of the module in a single statement
Assessment Criteria, and weighting A series of specifications for operating the module
Learner expectations. The outcomes of the module, What are we trying to achieve.
Concepts to be taught The concepts included in this module
Specific Learner expectations. Detailed statements of student expectations
Assessment tools What is needed to evaluate the student. Standardising the assessment strategy used so that we can be confident in what the student learned in the module.

The Flexibility and it's focus on meeting the needs of the student, gives this curriculum clout. Accessibility options in this program is the key to it's uniqueness and its power. I will be discussing some of the unique ways it can meet the varied requirements of students by giving example of its implementation.

A number of times I have said that students and districts could look elsewhere to access learning resources in order for students to get the needed training. If a school finds itself in a situation where it can not provide resources for a module. That module could be contracted out or the student could look at other sources for covering the material.

Lets Illustrate this with an example.
A group of students have been working with a metal working teacher in the metal fabrication shop for the last few years. The teacher has a great deal of skills and has been working very hard at providing the experiences that this particular group of students need. One or two of the students have been working on a small desktop experimenter CNC milling machine, doing excellent work. They are definitely headed into a career path that would suggest that they will be machinists. and more than likely will work for one of the local shops on completion of their studies. The school being part of a small district does not have the resources (and are unlikely to provide them) to teach these students the advanced CNC skills they should have to enter the trade. Two students, who are hard working ,have been approached to work for the local machine shop on the weekends. The teacher has made special arrangements for these two students to work side by side with the local mill operator for two afternoons a week for a couple of months at the same machine shop to give them the skills needed to satisfy the competency requirements of the Advanced Module for milling and grinding in the Fabrication Studies Strand. This allows the student to get credit for their training as well as allows the community to make available resources to the students. The local machine shop, in its discussions with the teacher, has a clear set of expectations for it's part in providing these experiences for the students.

An other iteration of similar circumstances. A student who has been working with the machine shop for a long period of time has came into the school with skills that would make taking introductory courses redundant for that student. The curriculum allows teachers to evaluate students and give credit for modules and preexisting skills, and having the students move onto more advanced skills and modules offered by the school.

One of the high schools in Edmonton began to integrate some of the CTS modules into the regular subjects, allowing students to incorporate a CTS module as well as the regular curriculum for the high school course.

The principal of the school gave direction to the department heads of the school to make every effort to integrate a module of CTS into their course. (Some of the driving force of this directive was funding issues in our site based management model) Chemistry 30 (Senior Chemistry) has a study of Electrolytic cells and electrical energy as part of it's curriculum, The teachers provide CTS curriculum in Alternate Energy sources as an integrated couplet of curriculum. Obviously this is integrating technology into core subjects. On completion of the course the student will receive credit in both Chemistry 30 and a module from the Electro-Technologies strand.

As you can see, Linkages between material become evident and not only has the Chemistry 30 class been enhance by the practical application of the material presented, but the student can begin to understand the technologies and their applications. (Integrating Technology Education into the core curriculum. **BRAVO !!!! Isn't that what we've wanted in this profession for a long time?)**

English 20 (Junior English)(Grade 11) linked an Information processing module using the computer to create presentations with the material they learned in class. Again using the technologies in the core class.

Lets look at a Junior High Technology Education Course. It was made clear that the Junior High teacher was expected to look at the curriculum and incorporate it in innovative ways. It was not important that a complete module was completed. Material can come from a series of modules to create a course. Lets use these parameters to create a course that would focus on problem solving and the understanding of Technology in our society. Technology education has a pretty big root in our science curriculum at this point in time so the integration of the Technology Studies and the science curriculum would make the marriage of the two areas ideal and mutually beneficial. I believe that there is nobody better than the technology teacher to provide the student the hands on learning that Technology Education expects.

Given a series of outcomes that expect students to use the problem solving model to design solutions to problems. And expecting them to present their proposals , a mouse trap car activity for instance, would be taking material from introductory level modules from Fabrication Studies, Design Studies, Information Processing and Mechanics. What about Land fill sites and the problems they create. We could use parts of modules from Energy and Mines, Design Studies, Wildlife, and Information processing. The combinations become endless and exciting.

As flexible as this curriculum appears, it is also very prescriptive and accountable. The documentation in place describe very specifically the requirements of any module. Evaluation standards and specifications are clear and concise. Rubrics for evaluation, charts for observation and specific skill expectations are outlined for the teacher. Because the curriculum had a lot of input from the professional in the field, transitions into post secondary or other professional training programs are smooth and seamless. The accountability of the curriculum has created a situation where post secondary institutions are confident in the material that is being presented to students at the secondary level. The ability of Industry or the community to be involved in the education of students has created a situation where professional organizations are confident in the skill levels of students graduation from CTS courses. Both Industry and post secondary institutions are accepting the credentualling of these students.

Approved Resources have been identified and specified. Suggested textbooks, Audio Visual material, and other specified resources have been made available through our Learning Resources Distribution Center and most optional resource material is available though local distributors.

Along with minimal equipment suggestions for starting a module, specific requirements of the facility is outlined for each module as well. Teacher skills are outlined identifying the requirements of the teacher and the professional who will be training the student the material in the module.(If it is outside the school) Even though a non professional teacher may be involved with some of the training, it is expected that the trainer and the student be under the direction of a certificated teacher.

It took a long time to put the CTS curriculum in place. About 10 years from the original Secondary education review to final implementation in September of 1997. Input was received from all stakeholder groups in all phases of the curriculum development. Each Strand had a curriculum writing team with representatives from Industry, the general public, and the teaching profession. Their work was available to any concerned party at any time and a massive mail out of material to anyone volunteering to comment on work in progress. This was truly a open process. The powerful part of the Modular system is that each module can be updated, modernized, deleted or expanded to meet the needs of each year. A complete curriculum will not need to be rewritten again. Modules deleted, added, adjusted, and corrected will help to keep this curriculum area dynamic and responsive to shifts in our society and technology.

We a very proud of the work that has been done on this curriculum to date and we wish to share it with everyone. We foresee very innovative programming in our schools where the winner will be the student, and after all That is our purpose.

Information on our curriculum is freely distributed and easily obtained. All of the topics I have discussed this morning are available to you on the Internet through The Alberta Education Web site. In fact teachers and the public, use that

site to obtain any and all updated curriculum material they need to do their job well. Any documents you see here to day come from and are available from there. I believe that anyone here has access to the Internet, and I would Encourage you to access, download and otherwise use the information available to you. The Web site for this material is **http//ednet.edc.gov.ab.ca** . Make sure you go to the CTS area for this material. I also encourage you to browse through the documents I have brought today to give you some idea of the gold mine of material that is available to the teacher. It will also help to make the material I have covered so quickly, a little more clear. If you do not get one of the handouts I have today Please contact me via e-mail at **jhesling@epsb.edmonton.ab.ca** I would be happy to send you an electronic version. But I would encourage you to write the Web site address as a rich source of curriculum material and input.

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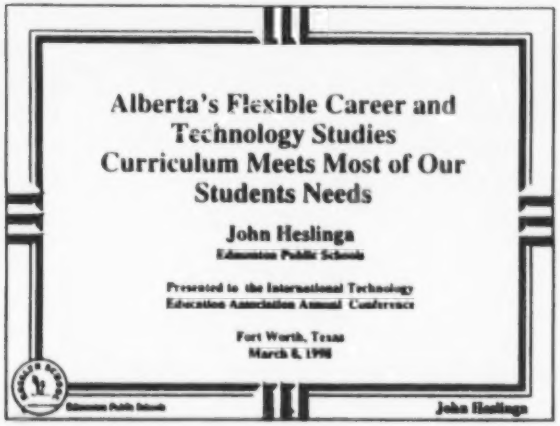
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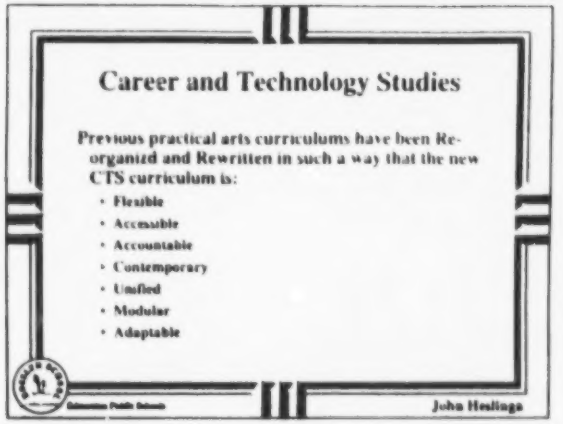

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Definitions
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"a body of knowledge and action that is used by humans to extend their potential for controlling and modifying the natural and human made environment"
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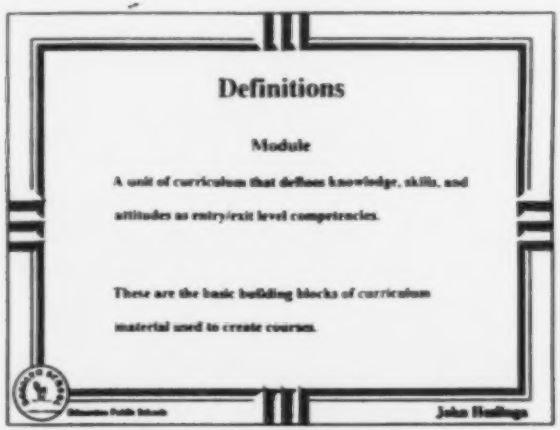
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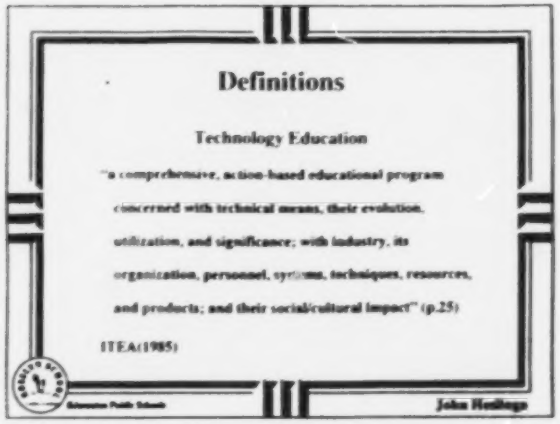
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ITEA(1985)
John Hudings

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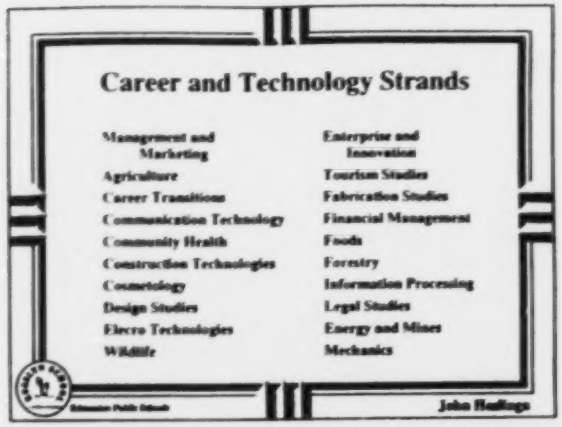

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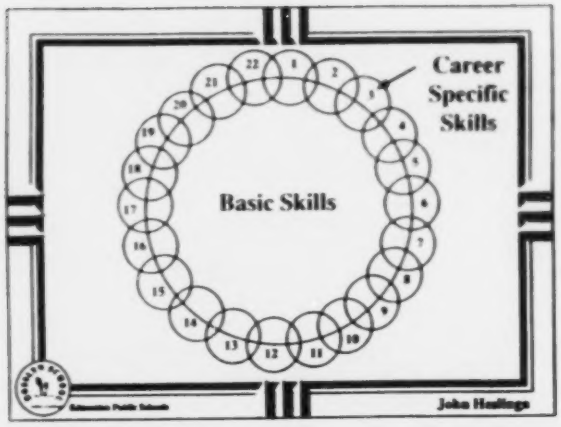
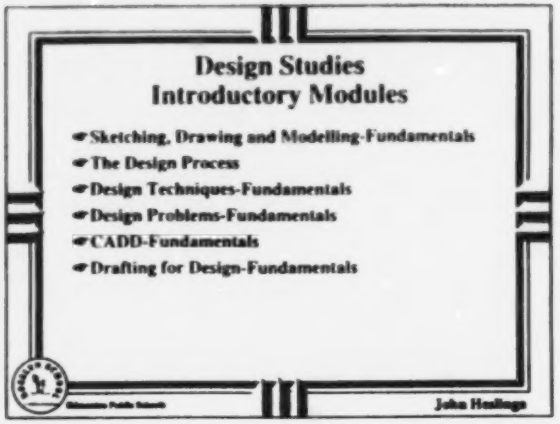


This model in this slide will illustrate the interrelation of skills in career strands. Many skills, knowledges, and attitudes in the career spectrum are similar from career to career. Others are universal in nature. Therefore it is understood that some modules may be selected from any career or technology strand to enhance the course an educator might be planning. An example of such transferable skills is pattern drafting. We use pattern drafting in the manufacture of sheet metal products and we must also use similar skills in the manufacture of clothing, furniture upholstery, and model making in product design. Therefore an educator teaching a clothing manufacturing course would select the same design module as the sheet metal instructor. The Technology Teacher on the other hand would use parts of the design module as curriculum material for the Technology Studies course. It is clear that the focus will be different for specific strands, but the underlying skills are not.



As seen in this next few slides we have a list of modules in the Design Studies Strand.
A very quick perusal of the lists of modules would indicate a course created by using only modules from this strand would be very career oriented indeed. This is part of the "Career" aspect that the curriculum addresses. It is also very evident that the Advanced level modules are very career specific and unlikely to be used in other strands. But one has to remember that if all of these modules were taught it would take approximately 525 hours. Obviously this would be a program of studies and not just one course. Depending on the resources of the school maybe even impossible to get access to all of the modules.

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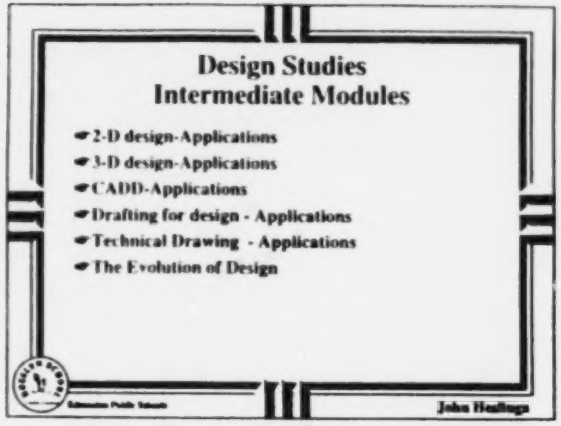
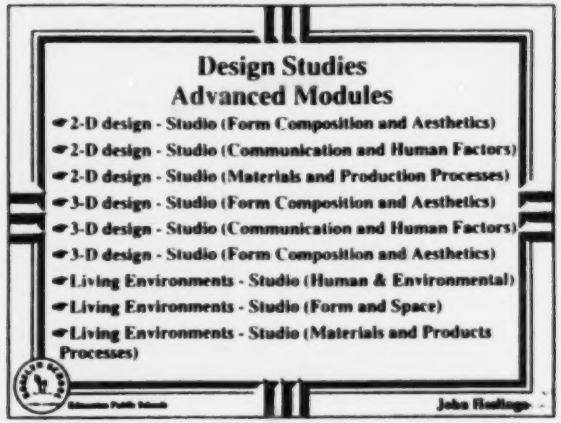


Within each strand, modules are organized into three levels of achievement; Introductory, Intermediate and Advanced. A program intending a student to follow a particular strand for career entry level training, would naturally follow the sequence outlined in each strand. Different courses would have modules starting at the introductory level and moving to more advanced levels where more specific skills are included.


Design Studies
Advanced Modules
2-D design - Studio (Form Composition and Aesthetics)
2-D design - Studio (Communication and Human Factors)
2-D design - Studio (Materials and Production Processes)
3-D design - Studio (Form Composition and Aesthetics)
3-D design - Studio (Communication and Human Factors)
3-D design - Studio (Form Composition and Aesthetics)
Living Environments - Studio (Human & Environmental)
Living Environments - Studio (Form and Space)
Living Environments - Studio (Materials and Products Processes)
John Hastings

A teacher setting up a course for introductory design for example, would choose anywhere from 3 to 5 modules of curriculum for that course in the Introductory and intermediate levels. The teacher would decide on the focus of the course and because valid curriculum modules have been chosen , the course would be a valid course under the auspices of the mandated curriculum.

Students who have satisfied the outgoing competencies of a module would be considered to have completed that module and would earn 1 credit toward a high school diploma. Should they need that module of information in any other course or program, elsewhere, they will be considered to have completed it and not expected to redo that module.

Students not completing a course could in fact have completed a number of modules within the course and would be credited for those modules and therefore, partially completing the course. (Should they need to repeat the course they would begin where they left off)

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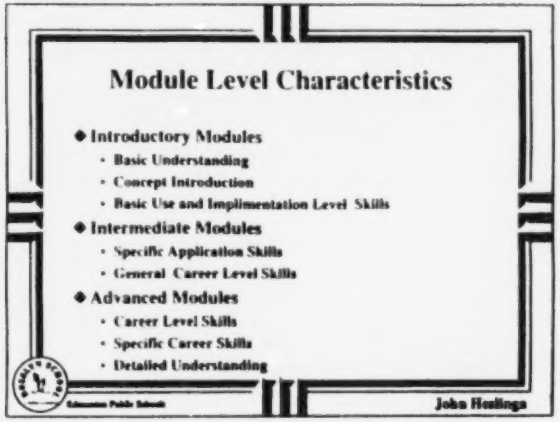
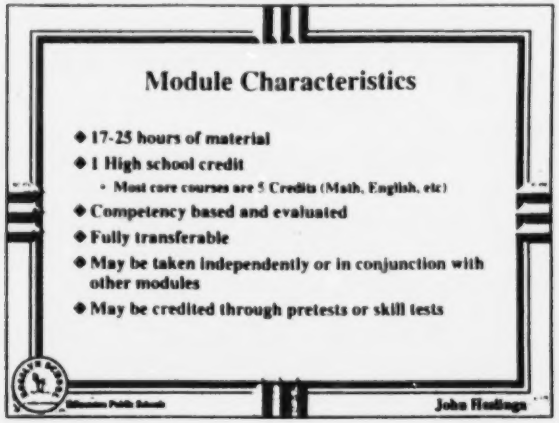


By selecting a series of modules, a course can be built to meet the needs of the student. Dropping and or adding modules to a course should they be required to meet the changing need. A wise teacher would create a course that might cover 5 modules for instance, and it is the expectation that students to complete 4


Module Characteristics
◆ 17-25 hours of material
◆ 1 High school credit
• Most core courses are 5 Credits (Math, English, etc)
◆ Competency based and evaluated
◆ Fully transferable
◆ May be taken independently or in conjunction with other modules
◆ May be credited through pretests or skill tests
John Hudinga

This would help to meet the needs of those students who come into a class with a wide range of previous skills. The student who completes all 5 would be credited accordingly. Maybe a student who misses prerequisite courses could be tutored to catch up and then receive credit for the prerequisite modules as well.

It should be quite evident that the tie to time has finally disappeared (The Carnegie unit is being set to rest) and that the focus is now on competencies. As a competency based curriculum, we see it becoming the model for future curriculum organizations in Alberta in all subject areas.

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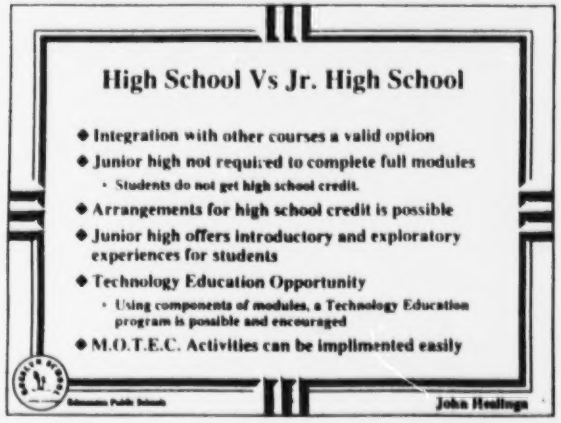
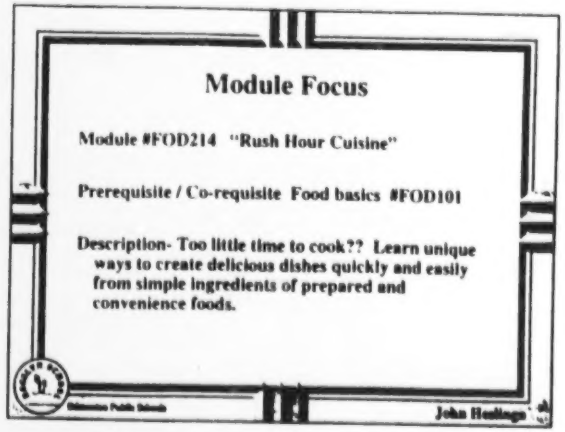

High School Vs Jr. High School
◆ Integration with other courses a valid option
◆ Junior high not required to complete full modules
• Students do not get high school credit.
◆ Arrangements for high school credit is possible
◆ Junior high offers introductory and exploratory experiences for students
◆ Technology Education Opportunity
• Using components of modules, a Technology Education program is possible and encouraged
◆ M.O.T.E.C. Activities can be implimented easily
John Hastings

This was not a difficult curriculum transition for senior high school teachers of Career or Technology related disciplines because they simply choose material in their specific strand to create a course. Teachers in junior high schools, who were teaching Industrial Arts (The Alberta Plan) and Home Economics, were required to reassess their programs because these curriculum areas were no longer necessarily separate areas of study, but components of each can be found in many of the introductory modules of the new CTS curriculum.

Because students do not receive high school credit for courses taken at the junior, or middle school level, the curriculum allows a CTS course at the Junior high school to cover only small parts of modules if desired to create innovative programming. (students are required to have access to 3 elective courses per year) And (Exploratory and introductory programming is encouraged at the junior high school.) Hence the open door for Technology Education, and other innovative interpretations of the curriculum. Teachers will begin to see the advantages of integrating technology competencies into regular core curriculum. (I will be discussing examples of this a little later with some discussion on Technology Education)

In fact a document is available to Alberta teachers, called Technology Studies, A Technology Education Program that meets the requirements of CTS, including learning activities and module cross references. This document is intended to be a teachers package that allows them to provide an ITEA endorsed technology education course at the junior high school level. It uses learning activities identified as appropriate for teaching Technology by the Michigan, Ohio, Technology Education Consortium, and assembled by that group.


Module Focus
Module #FOD214 "Rush Hour Cuisine"
Prerequisite / Co-requisite Food basics #FOD101
Description- Too little time to cook?? Learn unique ways to create delicious dishes quickly and easily from simple ingredients of prepared and convenience foods.
John Hastings

The following example of a module from the Foods Strand will give us an idea how the focus we put a module can give it a very different flavour.
Module #FOD214 "Rush hour Cuisine"
Prerequisite / Co-requesite Food basics #FOD101
description- Too little time to cook?? Learn unique ways to create delicious dishes quickly and easily from simple ingredients of prepared and convenience foods.

If we were using this module in a foods class, it would be very clear what might be expected for this module. The very kind of cooking I have to go through a lot of days on my return to home from a busy day at school. (Pretty familiar right??) Slight modifications in focus would allow this module be used in a tourism course focusing on "Inn management". (Example course: "Inn Management" one of the courses offered by a New England High school where a lot of students could easily work for small family run Inns) This changes the focus to Fast, Convenient meal preparation for customers. Different convenience foods would be discussed. And different levels of preparation. Note that we can now begin to address the needs of student in their community. (This type of course may only be needed for 2 to three years and needed immediately. Curriculum development could take much too long to get a course like this approved by the department of education. (Developed and approved))

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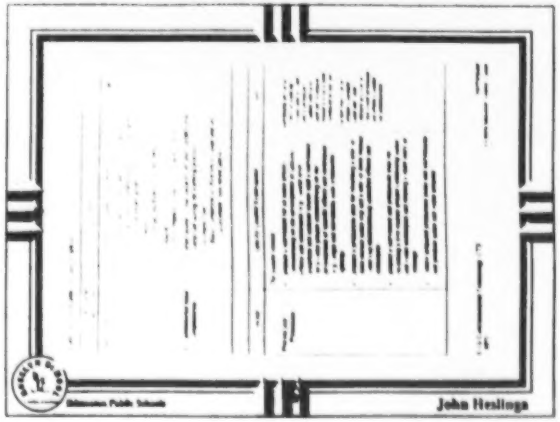
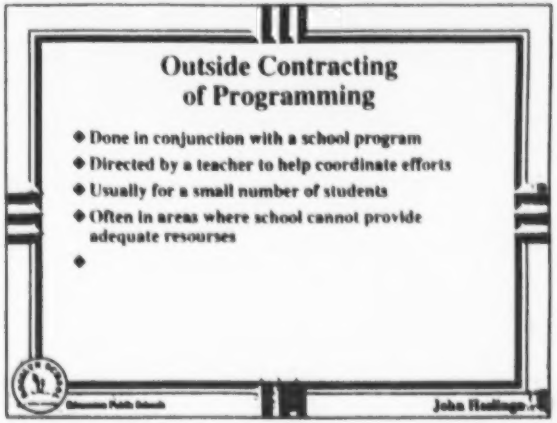


The Specifications of this module are outlined in a document that looks like this

I would like to highlight the following things on these sheets
Description of Module- This gives the purpose of the module in a single statement
Assessment Criteria, and weighting. A series of specifications for operating the module
Learner expectations. The outcomes of the module, What are we trying to achieve
Concepts to be taught. The concepts included in this module
Specific Learner expectations. Detailed statements of student expectations
Assessment tools. What is needed to evaluate the student. Standardising the assessment strategy used so that we can be confident in what the student learned in the module

The Flexibility and it's focus on meeting the needs of the student, gives this curriculum clout. Accessibility options in this program is the key to it's uniqueness and its power. I will be discussing some of the unique ways it can meet the varied requirements of students by giving example of its implementation

More Specifications


Outside Contracting
of Programming
◆ Done in conjunction with a school program
◆ Directed by a teacher to help coordinate efforts
◆ Usually for a small number of students
◆ Often in areas where school cannot provide adequate resourses
◆
John Heslinga

A number of times I have said that students and districts could look elsewhere to access learning resources in order for students to get the needed training. If a school finds itself in a situation where it can not provide resources for a module. That module could be contracted out or the student could look at other sources for covering the material.

Lets Illustrate this with an example.
A group of students have been working with a metal working teacher in the metal fabrication shop for the last few years. The teacher has a great deal of skills and has been working very hard at providing the experiences that this particular group of students need. One or two of the students have been working on a small desktop experimenter CNC milling machine, doing excellent work. They are definitely headed into a career path that would suggest that they will be machinists. and more than likely will work for one of the local shops on completion of their studies. The school being part of a small district does not have the resources (and are unlikely to provide them) to teach these students the advanced CNC skills they should have to enter the trade. Two students, who are hard working ,have been approached to work for the local machine shop on the weekends. The teacher has made special arrangements for these two students to work side by side with the local mill operator for two afternoons a week for a couple of months at the same machine shop to give them the skills needed to satisfy the competency requirements of the Advanced Module for milling and grinding in the Fabrication Studies Strand. This allows the student to get credit for their training as well as allows the community to make available resources to the students. The local machine shop, in its discussions with the teacher, has a clear set of expectations for it's part in providing these experiences for the students.

An other iteration of similar circumstances. A student who has been working with the machine shop for a long period of time has came into the school with skills that would make taking introductory courses redundant for that student. The curriculum allows teachers to evaluate students and give credit for modules and preexisting skills, and having the students move onto more advanced skills and modules offered by the school.

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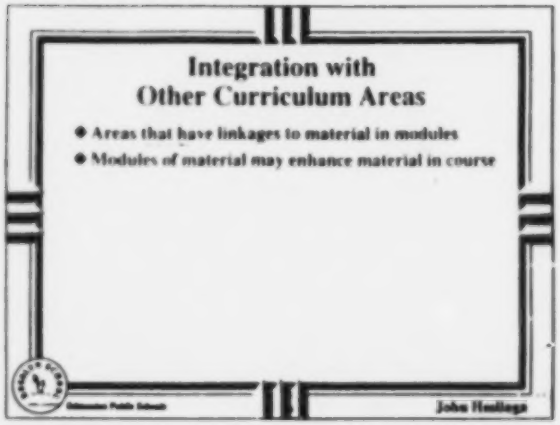
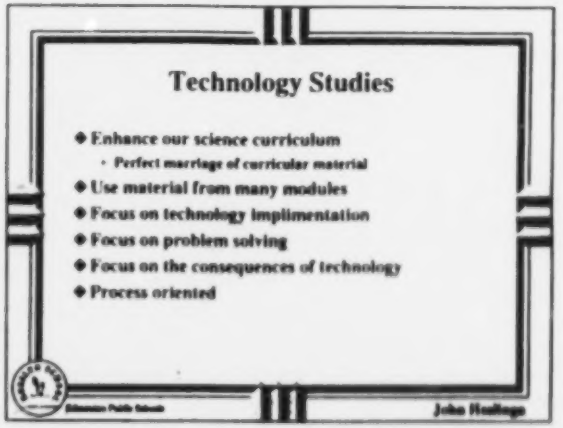

Integration with
Other Curriculum Areas
◆ Areas that have linkages to material in modules
◆ Modules of material may enhance material in course
John Huallaga

One of the high schools in Edmonton began to integrate some of the CTS modules into the regular subjects, allowing students to incorporate a CTS module as well as the regular curriculum for the high school course.

The principal of the school gave direction to the department heads of the school to make every effort to integrate a module of CTS into their course. (Some of the driving force of this directive was funding issues in our site based management model). Chemistry 30 (Senior Chemistry) has a study of Electrolytic cells and electrical energy as part of it's curriculum. The teachers provide CTS curriculum in Alternate Energy sources as an integrated couplet of curriculum. Obviously this is integrating technology into core subjects. On completion of the course the student will receive credit in both Chemistry 30 and a module from the Electro-Technologies strand.

As you can see, Linkages between material become evident and not only has the Chemistry 30 class been enhance by the practical application of the material presented, but the student can begin to understand the technologies and their applications. (Integrating Technology Education into the core curriculum. BRAVO !!!! Isn't that what we've wanted in this profession for a long time?)

English 20 (Junior English)(Grade 11) linked an Information processing module using the computer to create presentations with the material they learned in class. Again using the technologies in the core class.


Technology Studies
◆ Enhance our science curriculum
• Perfect marriage of curricular material
◆ Use material from many modules
◆ Focus on technology implimentation
◆ Focus on problem solving
◆ Focus on the consequences of technology
◆ Process oriented
John Huallaga

Lets look at a Junior High Technology Education Course. It was made clear that the Junior High teacher was expected to look at the curriculum and incorporate it in innovative ways. It was not important that a complete module was completed. Material can come from a series of modules to create a course. Lets use these parameters to create a course that would focus on problem solving and the understanding of Technology in our society. Technology education has a pretty big root in our science curriculum at this point in time so the integration of the Technology Studies and the science curriculum would make the marriage of the two areas ideal and mutually beneficial. I believe that there is nobody better than the technology teacher to provide the student the hands on learning that Technology Education expects.

Given a series of outcomes that expect students to use the problem solving model to design solutions to problems. And expecting them to present their proposals , a mouse trap car activity for instance, would be taking material from introductory level modules from Fabrication Studies, Design Studies, Information Processing and Mechanics. What about Land fill sites and the problems they create. We could use parts of modules from Energy and Mines, Design Studies, Wildlife, and Information processing. The combinations become endless and exciting.

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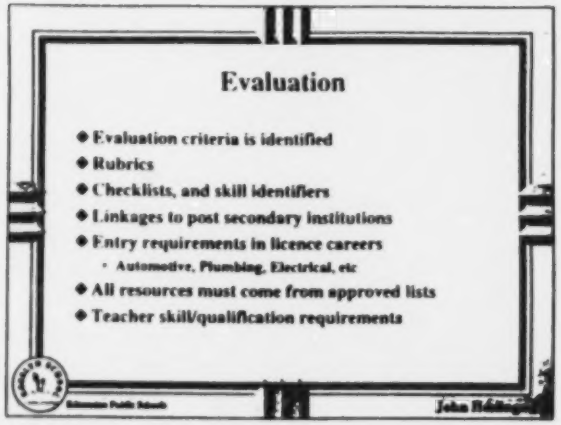
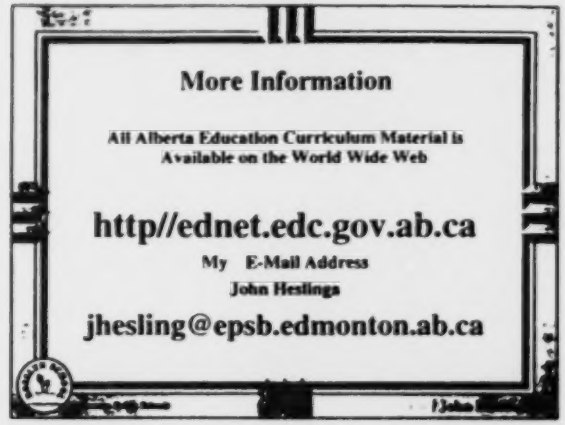

Evaluation
◆ Evaluation criteria is identified
◆ Rubrics
◆ Checklists, and skill identifiers
◆ Linkages to post secondary institutions
◆ Entry requirements in licence careers
- Automotive, Plumbing, Electrical, etc
◆ All resources must come from approved lists
◆ Teacher skill/qualification requirements

As flexible as this curriculum appears, it is also very prescriptive and accountable. The documentation in place describe very specifically the requirements of any module. Evaluation standards and specifications are clear and concise. Rubrics for evaluation, charts for observation and specific skill expectations are outlined for the teacher. Because the curriculum had a lot of input from the professional in the field, transitions into post secondary or other professional training programs are smooth and seamless. The accountability of the curriculum has created a situation where post secondary institutions are confident in the material that is being presented to students at the secondary level. The ability of Industry or the community to be involved in the education of students has created a situation where professional organizations are confident in the skill levels of students graduation from CTS courses. Both Industry and post secondary institutions are accepting the credentualling of these students.

Approved Resources have been identified and specified. Suggested textbooks, Audio Visual material, and other specified resources have been made available through our Learning Resources Distribution Center and most optional resource material is available though local distributors.

Along with minimal equipment suggestions for starting a module, specific requirements of the facility is outlined for each module as well. Teacher skills are outlined identifying the requirements of the teacher and the professional who will be training the student the material in the module (If it is outside the school) Even though a non professional teacher may be involved with some of the training, it is expected that the trainer and the student be under the direction of a certificated teacher.



It took a long time to put the CTS curriculum in place. About 10 years from the original Secondary education review to final implementation in September of 1997. Input was received from all stakeholder groups in all phases of the curriculum development. Each Strand had a curriculum writing team with representatives from Industry, the general public, and the teaching profession. Their work was available to any concerned party at any time and a massive mail out of material to anyone volunteering to comment on work in progress. This was truly a open process. The powerful part of the Modular system is that each module can be updated, modernized, deleted or expanded to meet the needs of each year. A complete curriculum will not need to be rewritten again. Modules deleted, added, adjusted, and corrected will help to keep this curriculum area dynamic and responsive to shifts in our society and technology.

We a very proud of the work that has been done on this curriculum to date and we wish to share it with everyone. We foresee very innovative programming in our schools where the winner will be the student, and after all That is our purpose.

Information on our curriculum is freely distributed and easily obtained. All of the topics I have discussed this morning are available to you on the Internet through The Alberta Education Web site. In fact teachers and the public, use that site to obtain any and all updated curriculum material they need to do their job well. Any documents you see here to day come from and are available from there. I believe that anyone here has access to the Internet, and I would Encourage you to access, download and otherwise use the information available to you. The Web site for this material is http// ednet.edc.gov.ab.ca . Make sure you go to the CTS area for this material. I also encourage you to browse through the documents I have brought today to give you some idea of the gold mine of material that is available to the teacher. It will also help to make the material I have covered so quickly, a little more clear. If you do not get one of the handouts I have today Please contact me via e-mail at jhesling@epsb.edmonton.ab.ca I would be happy to send you an electronic version. But I would encourage you to write the Web site address as a rich source of curriculum material and input.

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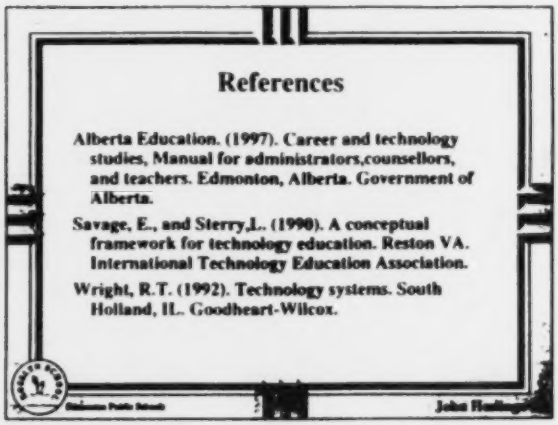
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